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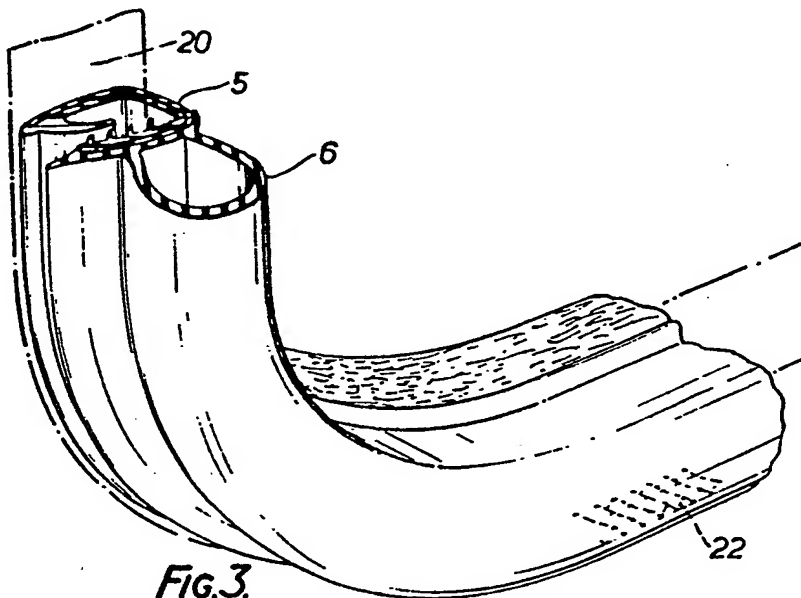
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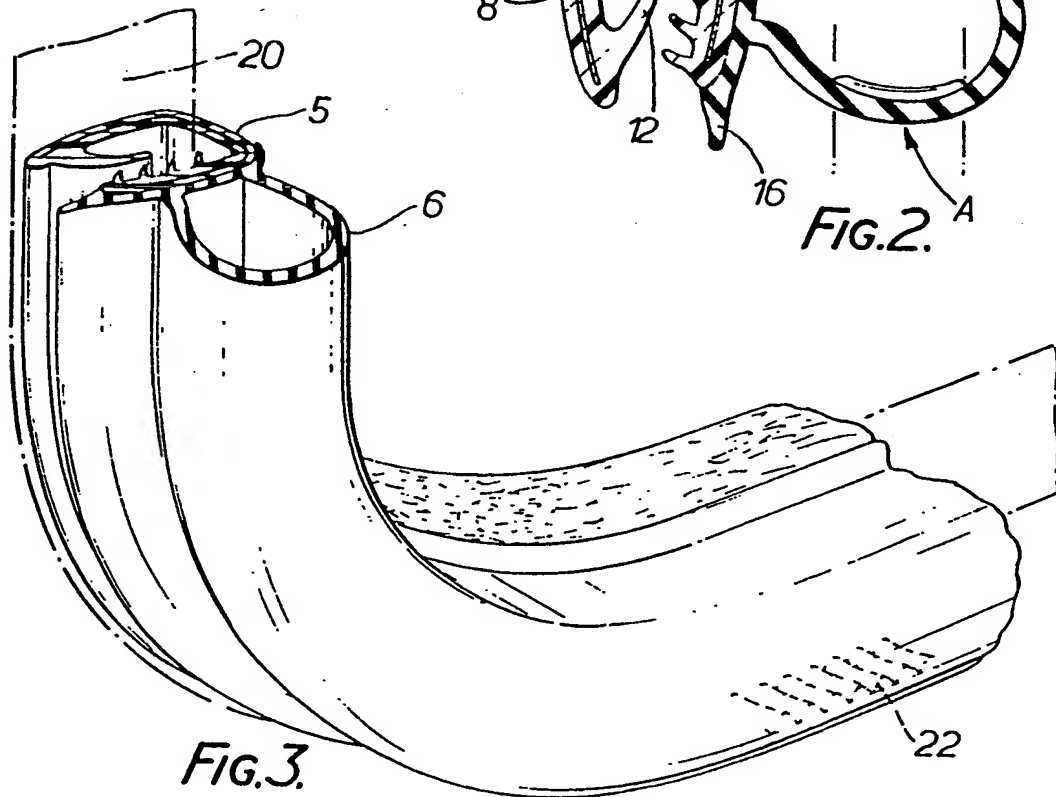
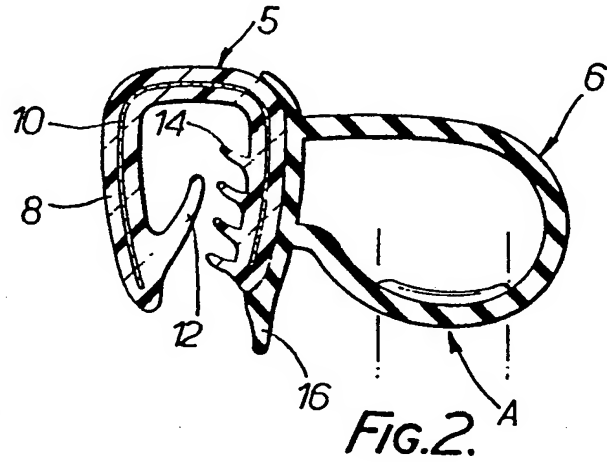
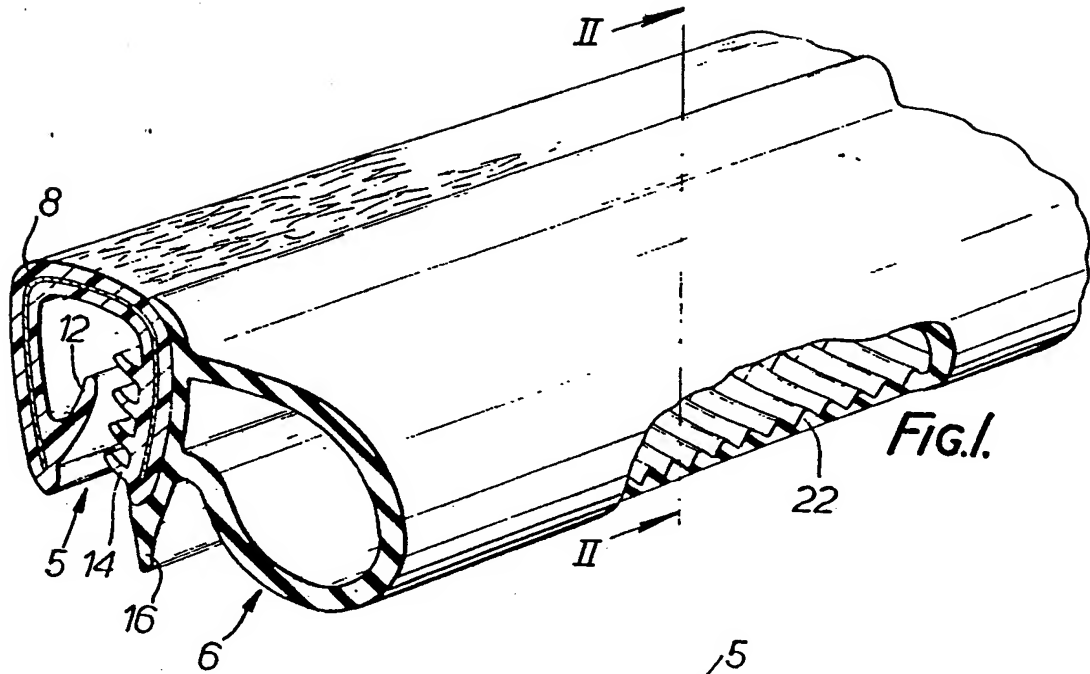
(54) Sealing strip

(57) A sealing strip, such as for a door opening in a motor vehicle body, comprises a gripping section 5, for grippingly embracing the flange running around the door opening, and a soft tubular sealing section 6 against which the door closes. The sealing section 6 is provided with stress-relieving corrugation 22 with the aim of eliminating or reducing distortion of the shape of the sealing section 6 where the strip is bent to follow the curvature of the door opening. The corrugations 22 may be provided on the inside surface, only, of the appropriate region of the sealing section 6. Instead, they may be replaced by slits.



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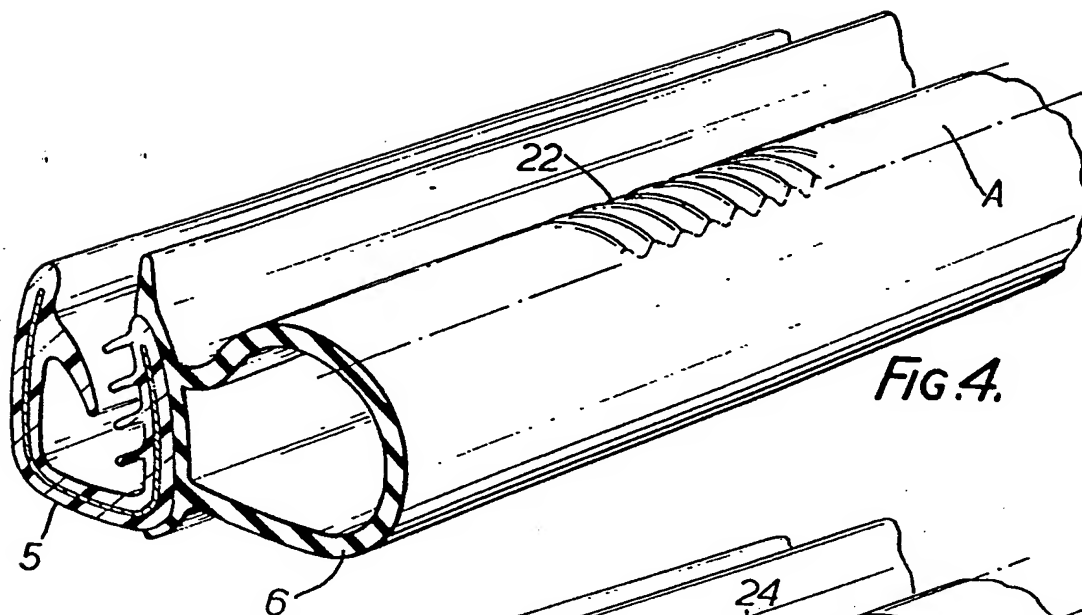


Fig. 4.

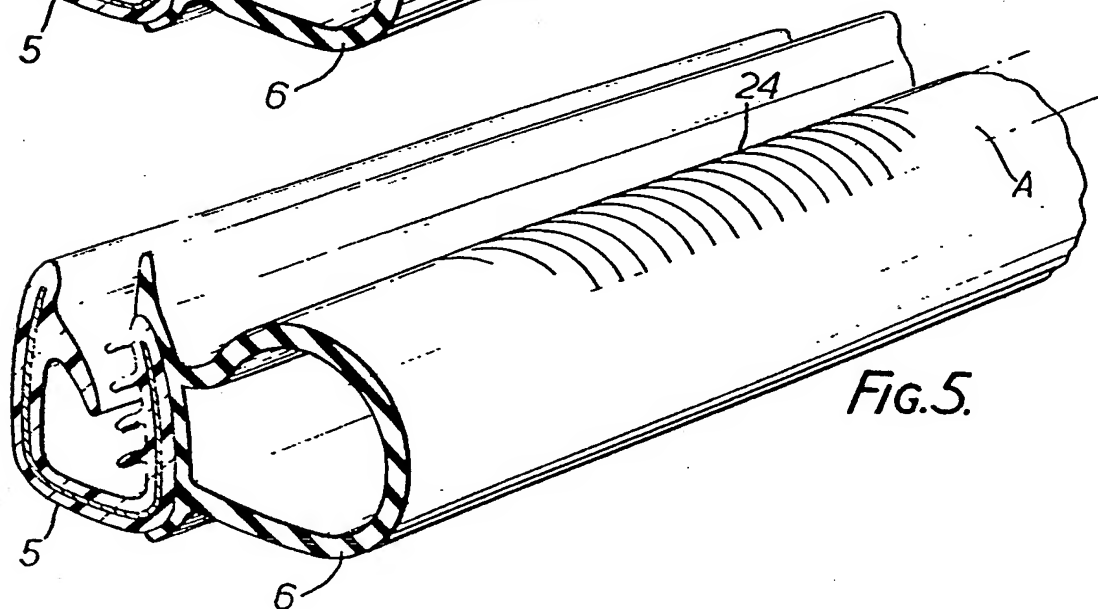


Fig. 5.

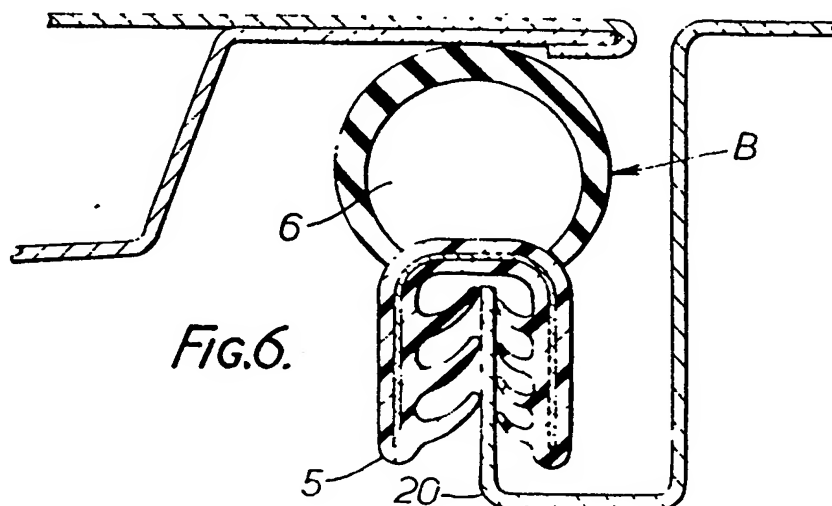


Fig. 6.

## SPECIFICATION

## Sealing strips

5 The invention relates to sealing strips. Sealing strips embodying the invention and to be described below may be used, for example, for sealing around openings, such as door openings, in motor vehicle bodies, though are not restricted to such use.

10 According to the invention, there is provided a sealing strip, comprising longitudinally extending flexible material provided with a plurality of stress-relieving formations extending transversely to its longitudinal direction, whereby to minimise stress in the region of the formations when the strip is curved about an axis spaced from but extending in substantially the same direction as each said formation.

20 According to the invention, there is further provided a sealing strip, comprising a longitudinally extending channel-shaped gripping section, and a longitudinally extending flexible hollow tubular sealing section supported on the outside of the gripping section, the sealing section being provided with a plurality of side-by-side stress-relieving formations which extend substantially perpendicularly to the longitudinal extension of the sealing section in a region thereof which is to be curved about an axis spaced from but substantially parallel to the directions of extension of the said formations.

35 Sealing strips embodying the invention will now be described, by way of example only, with reference to the accompanying diagrammatic drawings in which:

40 *Figure 1* is a perspective view of one of the sealing strips, with part broken away to show interior construction;

*Figure 2* is a cross-section on the line II-II of Fig. 1;

45 *Figure 3* is a perspective view showing the sealing strip of Figs. 1 and 2 in a curved configuration; and

*Figures 4 and 5* show (in inverted form compared with Fig. 1) modified forms of the sealing strip of Figs. 1 to 3.

50 The sealing strip to be described with reference to Figs. 1 to 3 comprises a channel-shaped gripping section 5 and a tubular-shaped sealing section 6. The gripping section 5 comprises (in this example) channel-shaped flexible material 8, such as plastics or rubber material, in which is embedded a reinforcing core or carrier 10, preferably made of metal (see Fig. 2). The carrier 10 may be of any suitable form. For example, it may be in the form of U-shaped metal strips which are arranged side-by-side along the length of the channel and are connected to each other by flexible interconnecting links or possibly entirely disconnected from each other. Other forms of carrier are possible: for example, the

carrier could be made of wire looped to and fro.

70 On the inside of the channel, the material 8 defines inwardly directed gripping lips, in this example shown as one large gripping lip 12 and four smaller gripping lips 14. However, other forms of gripping lips may be used.

75 The sealing section 6 comprises plastics or rubber material in the form (in this example) of a hollow tube which is attached along one side wall of the channel of the gripping section 5, such as by means of adhesive. In this example, the gripping section 6 also defines an integral downwardly extending lip 16. Preferably, the sealing section 6 is made of softer material than the material 8. For example, the material 6 may be of sponge or foamed consistency.

85 Advantageously, the strip is produced by an extrusion process. Thus, a cross-head extrusion process may be used to extrude the material 8 onto the carrier 10, this extrusion process also producing the integral lips 12, 14. The extrusion process may if desired be such that the lips 12, 14 are softer than the remainder of the material 8. The sealing section 6 may likewise be produced by an extrusion process. This may be a separate extrusion process from that which produces the gripping section 5, and the two parts may then be joined together by adhesive. Instead, however, both the gripping section 5 and the sealing section 6 may be co-extruded (again so as advantageously to produce the required different degrees of hardness).

100 In use, the strip is fitted to an opening, such as a door opening, in a motor vehicle body by placing the gripping section 5 over the flanged joint which runs around the opening (the joint providing a flange which lies in the plane of the door opening). The gripping section 5 embraces the flange and is firmly held in position thereon by the resilience of the carrier 10 and the action of the lips 12, 14. The strip is placed on the flange so that the sealing section 6 is supported to extend around the door opening in such a manner that the door of the opening closes onto, and partially compresses, the sealing section 6 to provide the desired weather seal.

115 It will be appreciated that such door openings almost always have at least one curved bend (as opposed to a sharp corner of, for example, right angled configuration), and it is therefore necessary for the strip to match the curvature of such bend when placed on the flange. Fig. 3 shows part of a length of the sealing strip mounted in position on the flange (which is shown in outline only by the dotted line 20) as it follows such a bend. It will be apparent, therefore, that the sealing section 6 has to follow this curvature.

120 In order to facilitate the smooth curvature of the sealing section 6, at least part of at least its inner surface is provided with crinkles or

corrugations as shown as 22 in the broken away part of Fig. 1. These corrugations 22 relieve the stress which can be set up in the sealing section 6, where it is curved as shown in Fig. 3. The corrugations are shown dotted in the latter Figure. In the absence of such corrugations, there is a tendency for stress to be set up in the sealing section 6 which causes its shape to be distorted at the bend. For example, such stress could cause the surface of the sealing section 6 on the outside of the bend to tend to straighten or bridge across the bend. This not only presents an unsightly appearance but the resultant distortion impairs the proper sealing action of the sealing section 6. By relieving the stress, the corrugations 22 help to reduce this problem.

Advantageously, the corrugations 22 are only provided along the inside surface of the section 6, the outside surface remaining smooth so that the corrugations are not externally visible. However, this is not essential: the corrugations can be provided on the outside surface as well as or instead of on the inside surface. As shown in Fig. 2, the corrugations lie along a region A.

The corrugations may only need to be provided along those regions of the sealing section 6 which are going to be placed onto curved bends. However, the corrugations could if desired be provided along the whole of the length of the sealing section.

The corrugations may be formed during the extrusion process which produces the sealing section.

Another advantage of the corrugations is that the compressibility of the sealing section 6 is increased and this provides a lower resistance to the door closure, without impairing the sealing action.

In Figs. 4 and 5, parts corresponding to those in Figs. 1 to 3 are similarly referenced.

Fig. 4 shows a modification in which the corrugations 22 run along the outside of the sealing section 6.

Fig. 5 shows a modification in which the corrugations 22 are replaced by slits 24. Each slit extends partly or wholly through the material of the sealing section 6 and extends over the region A. The slits 24 act in similar fashion to the corrugations 22 to relieve the stress referred to above.

Fig. 6 shows another embodiment, and parts corresponding to those in the other Figures are similarly referenced. The embodiment of Fig. 6 is for sealing around an opening such as a luggage compartment opening in a motor vehicle body, where the bodywork defines a flange 20 which (unlike that described above) lies perpendicularly to the plane of the opening. In such a case, therefore, the sealing section 6 is positioned on the outside of the base of the channel of the gripping section 5 instead of on the side of that channel. When such a strip is curved

to match a curvature in the flange of the opening, the stress referred to above will thus be set up along the side B of the sealing section 6, and it would be along the region of this side B that the corrugations 22 or the slits 24 would be provided. Fig. 6 shows the door 26 of the opening, which closes down onto, and partially compresses, the sealing section 6 (though for clarity the latter is not shown compressed in the Figure).

## CLAIMS

1. A sealing strip, comprising longitudinally extending flexible material provided with a plurality of stress-relieving formations extending transversely to its longitudinal direction, whereby to minimise stress in the region of the formations when the strip is curved about an axis spaced from but extending in substantially the same direction as each said formation.

2. A strip according to claim 1, in which the said formations comprise corrugations.

3. A strip according to claim 2, in which the corrugations are provided along a surface of the flexible material on the inside of the curvature but not on the corresponding outside surface.

4. A strip according to claim 1, in which the said formations are a plurality of slits extending at least part way through the flexible material.

5. A strip according to any preceding claim, in which the flexible material is in the form of a hollow tube.

6. A strip according to any preceding claim, in which the flexible material is supported on channel-shaped gripping means extending alongside it the gripping means being adapted to grippingly embrace a mounting flange or the like.

7. A sealing strip, comprising a longitudinally extending channel-shaped gripping section, and a longitudinally extending flexible hollow tubular sealing section supported on the outside of the gripping section, the sealing section being provided with a plurality of side-by-side stress-relieving formations which extend substantially perpendicularly to the longitudinal extension of the sealing section in a region thereof which is to be curved about an axis spaced from but substantially parallel to the directions of extension of the said formations.

8. A strip according to claim 7, in which the sealing section is supported on the outside of one of the side walls of the gripping section, and the said region in which the formations lie is a region of the sealing section lying perpendicular to that side wall of the channel and parallel to and in substantial alignment with the mouth of the channel.

9. A sealing strip according to claim 7, in which the sealing section is supported on the outside of the base of the channel of the

gripping section, and the said region in which the formations lie is a region substantially perpendicular to the base of the channel.

10. A sealing strip according to any one of claims 7 to 9, in which the formations are corrugations in the material of the sealing section.

11. A sealing strip according to claim 10, in which the corrugations are provided in the material of the sealing section forming an inside surface thereof but not in the corresponding outside surface.

12. A sealing strip according to any one of claims 7 to 9, in which the said formations are slits which extend at least part way through the material of the sealing section in the said region.

13. A sealing strip, substantially as described with reference to Figs. 1 to 3 of the accompanying drawings.

14. A sealing strip, substantially as described with reference to Fig. 4 of the accompanying drawings.

15. A sealing strip, substantially as described with reference to Fig. 5 of the accompanying drawings.

16. A sealing strip, substantially as described with reference to Fig. 6 of the accompanying drawings.